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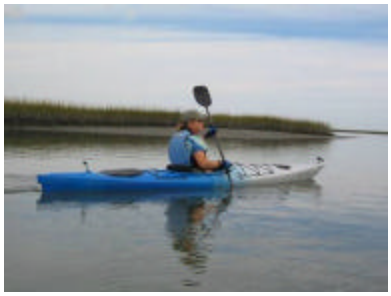


Virginia Seaside Heritage Program

Accomplishments 2002-2009

A 6 year $2.6 million effort to restore the Atlantic coast resources of Virginia's Eastern Shore, develop management strategies for long-term resource protection and support the ecotourism and aquaculture industries.

Virginia Coastal Zone MANAGEMENT PROGRAM

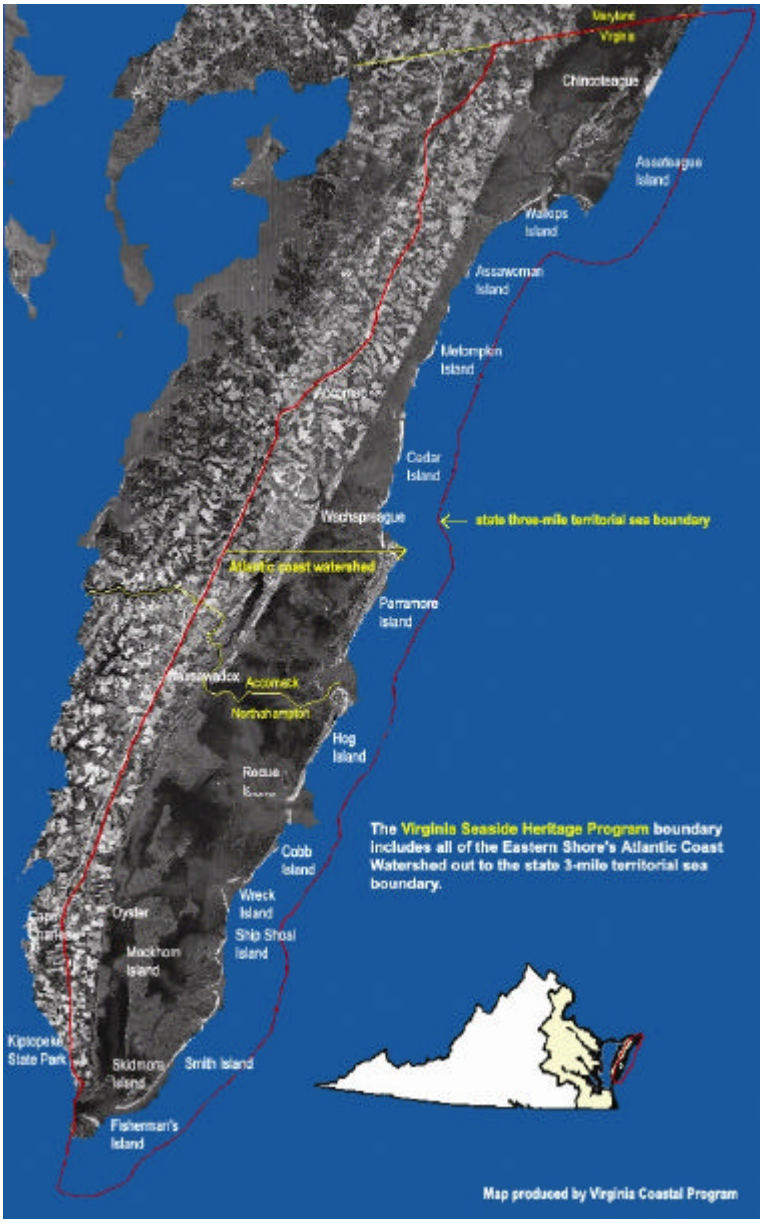
NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

Hope Revived for a Seaside Treasure

The Seaside of Virginia's Eastern Shore - a vast system of barrier islands, bays, and salt marshes - is a global treasure. It has been designated by the United Nations as a Man and the Biosphere Reserve. The intertidal and shallow subtidal areas, undeveloped beaches and marshes support a marvelous array of waterfowl and shorebirds. These habitats also serve as breeding, nursery and foraging sites for finfish and shellfish, which are of tremendous economic value to commercial and recreational fishermen.

Today the Seaside may look like a coastal wilderness. But it hasn't always been that way. British colonists first landed on its welcoming shores in the 1600's. Blackbeard and his pirates prowled these shores. By the 1800's, this barrier island lagoon system was a mecca for hunting, fishing, and recreating for people from Washington, D.C. to New York. Finfish and shellfish harvests provided income to thousands of Virginians. Unimaginable numbers of oysters, scallops, finfish, waterfowl and shorebirds were devoured from its seemingly limitless cornucopia.

But all that changed. Finfish and shorebird concentrations declined dramatically beginning in the late 1800's due to over-harvesting, disease, predation and loss of habitat. Powerful and destructive hurricanes and storms hit Virginia's Seaside in the 1880's, '90's and early 1900's.



Eventually, the cottages, hunt clubs, resorts and small communities were gone. As is so simply stated on the gravestone of Hog Island resident, Maggie Simpson (1844-1914), "How many hopes lie buried here." (from *Seashore Chronicles* by Barry Truitt and Brooks Miles Barnes)

Things have been fairly quiet on the Seaside since the Great Depression. But sadly, we had not seen a great resurgence of underwater grasses, oysters, scallops, finfish and birds. Resource managers, scientists, and the shore's residents wondered why, in the face of valiant conservation efforts over the last few decades, had the resources not rebounded?

Maggie Simpson's hopes may not lie buried much longer. Recent restoration success has brought new hope to the Eastern Shore through a public-private restoration partnership created by the Virginia Coastal Zone Management Program - the ***Virginia Seaside Heritage Program*** - in the fall of 2002.

The Virginia Seaside Heritage Program (VSHP) focuses on management of the aquatic resources of the barrier islands, bays, and salt marshes along the shore. This area holds tremendous potential to demonstrate appropriate management of economic development and habitat restoration within a rare and fragile ecosystem. The Virginia CZM Program and its partners have completed an ambitious six-year restoration program and are now working toward development of management techniques and policies that will ensure appropriate uses and protect this global treasure through a Special Area Management Plan.

Virginia Seaside Heritage Program
Goals and Project Highlights: 2002-2009

Habitat Restoration

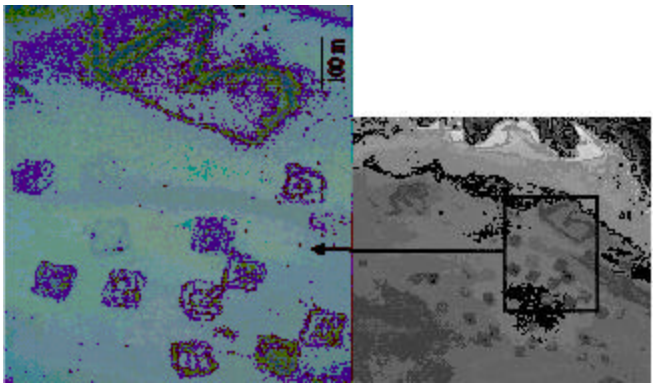
Goal: *Restore underwater grasses, oyster reefs, marshes and shorebird habitats.*

Eelgrass Restoration

Photo at left - Harvested from reproductive shoots, thousands of tiny eelgrass seeds are sowing big results on the Seaside. Not only are the restored beds thriving but a natural spread from the restored areas are dramatic in recent aerials. Dark Area surrounding the "W" in the aerial photo below right are small eelgrass patches from seeds produced by plants.

Eelgrass, *Zostera marina*, was once very abundant in the Seaside bays of Virginia's Eastern Shore. In the 1930s eelgrass suffered a massive decline due to a wasting disease. The decline was pandemic, affecting not only populations in the Seaside bays but populations on both sides of the Atlantic. Then, in August 1933, the region was affected by one of the most destructive hurricanes to influence the area in the twentieth century. The Seaside's eelgrass beds were decimated. Natural recovery of eelgrasses since that time has been limited primarily to Chincoteague, Sinepuxent, Isle of Wight and Assawoman bays, with no recovery south of Chincoteague Bay. Eelgrass seed ecology research by the Virginia Institute of Marine Science (VIMS) pointed to limited propagule (offshoot filled with seeds) supply as the most likely reason for no eelgrass recovery here.

Today, eelgrass restoration in Virginia's Seaside bays is a success story due to the Virginia Seaside Heritage Program and earlier restoration efforts supported by the Virginia CZM Program. Broadcasting seeds by hand instead of transplanting whole plants has proven to be an extremely effective method of restoration. Since 2001, 23 million seeds have been broadcast into 190 acres in South, Spider Crab, Cobb, and Hog Island bays. Eelgrass has spread considerably in South Bay. Aerial photography has shown that seagrass now occupies an area on the seaside of approximately 1400 acres. Water quality monitoring shows the parameters necessary for seagrass survival - light, turbidity, chlorophyll – remain within the habitat requirement established for seagrass.



Vertical aerial photographs (scale 1:24000) taken of the South Bay Restoration Site in December of 2004 show 0.4 ha plots of eelgrass resulting from seeds broadcast into unvegetated areas in 2001 and 2002.

While world-wide concerns about the loss of seagrass remain - due to many factors including sediments and nutrients and major climate events - eelgrass in Virginia's Eastern Shore Seaside bays is increasing. Eelgrass is spreading naturally as a result of the large scale restoration efforts undertaken by the VSHP. In fact, according to Dr. Robert Orth of VIMS who has conducted this work, recent aerial surveys show that this eelgrass appears extremely healthy with more flowering shoots than any place in the lower Chesapeake area.

Virginia CZM Investment to Date: $654,000 to the Virginia Institute of Marine Science

Oyster Restoration

Oyster restoration in the Eastern Shore's Seaside bays is conducted differently than in the Chesapeake Bay. Historically oysters in the Chesapeake Bay rivers grew in 8-10 foot high reefs. Seaside oysters tend to grow in lower profile beds.

From 1999 – 2002, the Virginia CZM Program invested $150,000 in seaside oyster restoration. Since 2003, approximately 4.9 acres of oyster reefs have been constructed on public oyster beds in Accomack County, and just under 5 acres of oyster reef have been constructed in Northampton County.

Local watermen/contractors have constructed the oyster reefs with either shucked shells, locally harvested fossil shells, or conch shells. Reefs generally require at least 25,000 bushels per acre, and they are constructed on degraded, intertidal reef footprints.

Spatsets are still relatively large and dependable on Seaside, so all reefs have been colonized and have significant oyster populations. Oyster diseases still significantly impact the larger oysters. All reefs are marked as "NO HARVEST" areas and with signage identifying the reefs as sanctuaries, but poaching continues to be an issue.

To help guide a continued comprehensive and effective restoration effort, the Virginia CZM Program funded the Virginia Institute of Marine Science (VIMS) Eastern Shore Lab to estimate the current population and distribution of oysters on the Seaside. This 2-year project, conducted using aerial observations and GPS, was completed in December 2008 and a GIS database was developed with layers detailing the distribution, abundance, size-frequency and biomass of oysters throughout the Seaside. The results showed 3.2 billion oysters on the Seaside compared to an estimate of about 1.8 billion oysters in the entire Virginia portion of the Chesapeake Bay.

Virginia CZM Investment to Date: $545,000 to the Virginia Marine Resources Commission and $140,000 to VIMS

Phragmites Mapping and Removal

Photo at right - Phragmites were mapped along the entire Seaside of the Eastern Shore in 2004, including all Virginia's barrier islands (Parramore Island is at left). 1400 occurrences were documented via helicopter. Patches were as small as 1/4 acre and as large as 90 acres.

On a national level, invasive species have been identified as the number two threat to biological diversity, second only to loss of species and habitat from development and urban sprawl. *Phragmites australis*, an invasive wetland grass also known as common reed, is one of the most serious and problematic invasive plant species in Virginia and other coastal States. This fast-spreading plant grows up to 4 meters tall and forms dense monotypic stands, crowding out other native marsh plants. The identification and treatment of *Phragmites* within high priority areas on the Seaside is necessary to slow the rate of spread of this species and protect natural biological diversity. In 2004, all patches of *Phragmites* on the mainland, lagoon system, and barrier islands of the Seaside were located (by helicopter flyovers), measured for area coverage and mapped using GPS by the Department of Conservation and Recreation (DCR) through the Virginia Seaside Heritage Program (VSHP). Approximately 2,024 acres of *Phragmites* existed on the Seaside in 1,404

patches with the largest patch covering 186 acres on Wallops Island. Average patch size was 1.4 acres. An 8-page map atlas plus large county maps were printed displaying locations of *Phragmites*. In order to prioritize *Phragmites* control efforts, these patches were compared with known occurrences of sensitive rare species habitats and communities. Phragmites management guidelines were developed for specific Seaside habitat types such as colonial bird nesting sites, mainland forest-marsh interfaces, barrier island swales, and dredge spoil sites.

In 2004, *Phragmites* control efforts were hampered by the damaging effects of high winds and salt spray from Hurricane Isabel. Isabel caused "top kill" of many *Phragmites* strands - although the root system of the plant remained protected underground, the tops of the plants were destroyed, rendering herbicides as an ineffective control method. A fairly new wetland herbicide - "Habitat" can be used earlier in the growing season (before hurricane season) and can eliminate *Phragmites* with one application.

In 2005, emphasis shifted to *Phragmites* control, especially targeting high priority patches such as the high marsh communities of the Parramore Island Natural Area Preserve, where 220 acres were treated by plane using “Habitat”. Staff used ground application to treat 7 acres at Mutton Hunk Fen Natural Area Preserve in Accomack County and on 1.5 acres at Wreck Island Natural Area Preserve in Northampton County.

In 2006, *Phragmites* was treated on 92 acres at Wallops Island; 40 acres at Parramore Island; and, 14 acres at Mockhorn WMA. DCR staff also treated two acres of *Phragmites* at Wreck Island Natural Area Preserve. All areas treated through this project are monitored and carefully assessed for treatment effectiveness. A refined GIS model of *Phragmites* spread was developed which, when intersected with rare species habitat and natural community data layers, predicts which natural heritage resource occurrences are most threatened by *Phragmites* invasion. *Phragmites* patches located near high risk resources are considered a high priority target. Aerial control treatments were conducted in several areas in summer 2008.

A *Phragmites* management plan for the Seaside was completed and provides a roadmap for what will be an on-going management challenge. *Phragmites* was remapped along the entire Seaside. The census answered key questions about how rapidly un-controlled *Phragmites* is spreading and how effective control measures have been over the last five years.

Virginia CZM Investment to Date: $394,231 to the Department of Conservation and Recreation *(for Phragmites mapping, control and education – see “Management and Education Goal page 9)*

Photo above - Royal Terns on barrier island beach.

Improving Avian Habitat

Historically, the Virginia Barrier islands have been among the most important nesting areas for shorebirds and colonial waterbirds on the entire Atlantic coast of North America. However decades of research have shown that beach nesting birds are in serious decline. The Virginia CZM Program has funded a variety of projects through the Virginia Seaside Heritage Program (VSHP) to study avian communities.

In 2002 and 2003, a GIS data layer of shorebird concentrations was produced based on data collected during aerial surveys along the Seaside in the mid 1990s. A separate project developed a digital image library and portfolio of aerial photography resources of the Seaside.

Eight years of aerial photographs were archived into orthorectified digital images, then used these as baseline data for a 2004 assessment of bird distributions and habitat.

Phragmites Impact on Birds

In 2004, VSHP funding determined changes in habitat suitability of the barrier islands for beach nesting birds over time, assessed the overlap in *Phragmites* distribution and high marsh habitat, and proofed a 30-year data set on colonial nesting birds along the barrier island chain. Each of these projects produced GIS data layers and summary information that will be used to forecast avian population response to habitat availability. Results of the projects have shown that *Phragmites* has invaded nearly 50% of high marsh patches and potentially represent a threat to birds and other wildlife that depend on these habitats. The Virginia CZM Program has a digital map and database of 1,921 waterbird colonies composed of 955,635 individuals. A follow-up project in 2005 determined the effect of *Phragmites* on the density and distribution of breeding birds that specialize on high marsh habitats. Finally, in 2006, funding extended the study of the effect of *Phragmites* on high marsh birds during the winter season, and to determined stopover lengths and resource use of migratory Red-Knots on the Seaside.

Shorebird and Clam Aquaculture Interaction

Partners in the Virginia Seaside Heritage Program, the Virginia Institute of Marine Science and the William and Mary Center for Conservation Biology worked together in 2003 on a project to understand how clam aquaculture affects the feeding activity of migratory shorebirds.

In the first part of this study, historical shorebird concentration data from 1994 through 1996 was combined with clam net locational data from the southern portion of the Seaside to produce a GIS map showing the actual overlap between shorebird foraging areas and clam aquaculture sites. Benthic samples were taken at sites with and without clam aquaculture to determine the type and abundance of prey species available to shorebirds and the potential impacts of clam aquaculture on prey availability. Ground-based surveys of shorebirds were used to quantify where shorebird foraging was occurring within clam aquaculture sites.

Concern over the potential impact of predator exclusion nets used in clam aquaculture on foraging habitat and prey availability for migratory shorebirds was addressed by (1) examining the potential areas of overlap of the two uses and (2) the availability of benthic invertebrates that serve as prey for foraging shorebirds at sites with and without clam aquaculture. The results indicate that there is currently only limited overlap between primary shorebird foraging habitats and clam aquaculture sites.

This finding is largely the result of the limited aerial exposure of the clam beds which are generally planted in the shallow subtidal and very low intertidal regions of mudflats. Surveys of benthic invertebrates which serve as prey for shorebirds were conducted in the early summers of 2004 and 2006 at clam aquaculture and control sites. The findings from both years indicate that both species numbers and total prey abundance in the sediments on clam farms (both between the nets and at locations which previously had nets) are comparable to both local and distant control sites. Further, they reveal that the macroalgae (seaweed) on the surfaces of the nets harbor species numbers and prey abundances that are comparable to or even greater than those found in surface sediments on and off clam farms. These prey include a wide array of species generally considered to be infaunal, including many that are known prey items for shorebirds. In short, although the time available for shorebirds to forage at clam aquaculture sites is limited by tidal exposure, data suggest that abundant and diverse prey are available at these sites.

Virginia CZM Investment to Date: $378,000 to the Center for Conservation Biology and Virginia Institute of Marine Science

Bird Predation Management

Predation by the raccoon and red fox is a major factor in the decline of shorebirds and colonial waterbirds on Virginia's Seaside. The Virginia CZM Program has been working with the Virginia Natural History Museum since 1998 to develop and implement a plan to manage these predators and restore avian nesting habitat on the Virginia Barrier Islands.

To test for the effects of predation management, US Fish and Wildlife Service field staff removed red foxes and raccoons from six Virginia Barrier Islands including Assawoman, Fisherman, Metompkin, Myrtle, North Cedar, and Ship Shoal. Avian nesting was then monitored from June to August 2004 with some very promising early results. Bird numbers and nest productivity increased in most cases. Colonial waterbird abundance in 2004 was greater than the five year average between 1998 and 2003. Piping plover nest productivity was the highest, since 1980, on Assawoman, Metompkin, and Cedar Island. Oystercatcher nest productivity was the highest ever reported on Metompkin Island.

These results indicate that predator removal can be effective. In reality, however, removals are seldom complete; it is common for 1-3 raccoons to remain on an island (or to re-colonize an island very quickly) even after a productive removal program. A new method was evaluated. Instead of physically removing predators, project staff "convinced" predators not to eat the eggs through conditioned taste aversion using Oral-estrogen as the "aversive agent" for reducing nest and egg predation. It is biodegradable, stable when injected into eggs, and shown to induce a conditioned taste aversion to shorebird, terrapin, and sea turtle eggs. Oral estrogen use was successfull in 2006. It influenced the foraging activity of individual raccoons, and it lasted long enough to bridge the period of avian egg-laying and incubation. Predation management is both more feasible and more effective as a conservation strategy on the Virginia barrier islands. Aversive conditioning appears to hold substantial promise for reducing depredation by predators on any island having low numbers of predators, either naturally or following a trapping campaign.

Virginia CZM Investment to Date: $167,100 to the Virginia Museum of Natural History

Sustainable Industries: Ecotourism and Shellfish Farming

Goal: *Develop sustainable ecotourism opportunities through construction or enhancement of public access sites, creation of a canoe/kayak water trail and map, and an ecotour guide certification course.*

Photo left - Organized canoe and kayak trips led by certified ecotour guides can help protect sensitive coastal resources and stimulate the economies of rural coastal counties.

Ecotour Guide Certification

In order to ensure that ecotourism remains a sustainable industry, the Virginia CZM Program began development of an ecotour guide curriculum and certification concept for the Eastern Shore of Virginia in 1997, and a pilot class was presented by the Virginia Institute of Marine Science (VIMS) in 2001. Through the Virginia Seaside Heritage Program this curriculum was modified and the first Ecotourism Guide Certification Training Course was held in 2003.

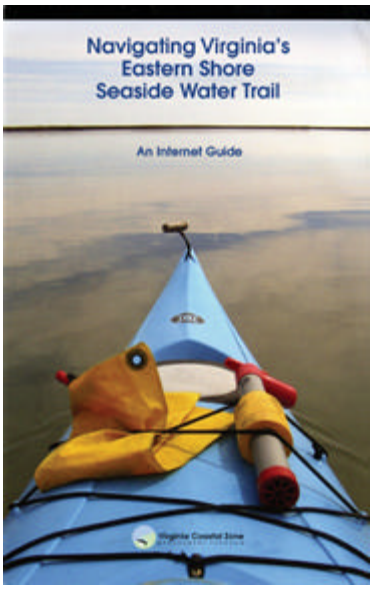
The goal of this course was to provide safe, responsible, and environmentally sound guidelines to encourage more responsible kayak and boating tours on the Eastern Shore and other Virginia coastlines. The course curriculum included barrier island rules and regulations and pertinent information about approaching wildlife.

Conducted by VIMS, the course included field and classroom work. Nineteen of the 24 attendees passed the required written final exam and received certifcates good for three years, as well as an official Virginia Ecotour Guide logo to denote their new status as certified operators.

In 2005, an Instructor Certification class was offered and 5 of the 7 certified guides became certified instructors. Also taught at the VIMS Wachapregue Laboratory, the course consisted of 16 hours of classroom instructions.

In the fall of 2007, the Virginia CZM Program began working with the Eastern Shore Community College (ESCC) to develop an Ecotour Guide Certification Curriulum at the college. This curriculum will be offered in fall 2009 as part of a larger tourism curriculum. The ESCC has met with the Virginia Tourism Commission to discuss ways in which a curriculum might be expanded into tourism regions throughout the Commonwealth.

Virginia CZM Investment to Date: $44,750 to the Virginia Institute of Marine Science and E. Shore Community College



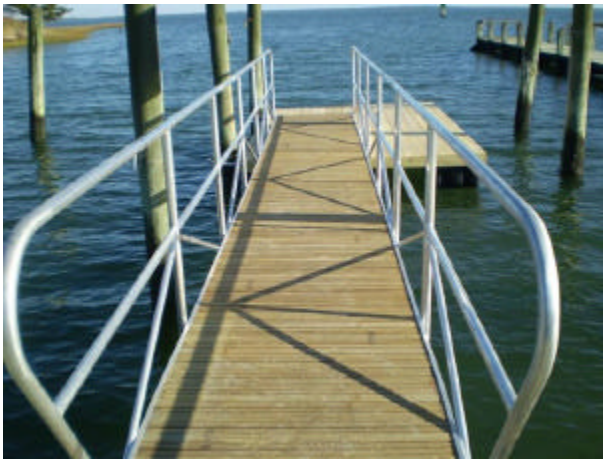
Virginia Seaside Water Trail

The Virginia Seaside Water Trail was created to help build an ecotourism infrastructure on the Seaside of the Eastern Shore. The trail was mapped out by a Certified Ecotour Guide, Dave Burden (Southeast Expeditions), with input from VSHP partners. The Virginia Seaside Water Trail offers over 100 miles of paddling routes through the Seaside's coastal bays. Over 30 routes have been mapped between the Eastern Shore Wildlife Refuge in Cape Charles to Chincoteague Island. The Virginia Seaside Water Trail website provides launch site and route descriptions and maps; expected paddling time and level of difficulty for each of the paddling routes; emergency and safety information; an overview of barrier island and protected land visitation policies; cultural resources and amenities near those locations; and, information on wildlife and conservation efforts along the trail. A brochure – *Navigating Virginia's Eastern Shore Seaside Water Trail* – was produced and is being distributed in Virginia's Coastal Zone to market the availability of the on-line guide to the trail – *www.deq.virginia.gov/coastal/Seasidewatertrail/homepage.html*.

Virginia CZM Investment to Date: $25,000 to the Accomack Northampton Planning District Commission

Floating Docks

To complement the trail, the Virginia CZM Program is working with the Accomack-Northampton Planning District Commission (A-NPDC) to install floating docks designed to make it very easy to get a kayak or canoe into the water. Floating docks are now available at Chincoteague Eastside Landing, Wachapreague Town Marina, Willis Wharf and Quinby Harbor.



Virginia CZM Investment to Date: $87,500 to the Accomack Northampton Planning District Commission

Willis Wharf Wildlife Observation Platform

The Virginia Department of Games and Inland Fisheries worked with the Accomack Northampton Planning District Commission and Virginia CZM to construct an observation platform in Willis Wharf, just across from the new floating dock. The platform provides an excellent venue for watching shorebirds feeding on the mudflats and aquatic vegetation around the Willis Wharf marina. It is a stop on the Virginia Birding and Wildlife Trail that consistently provides feeding and resting habitat for a variety of unique shorebirds such as godwits, skimmers, and a variety of sandpipers. In 2008, interpretive signage about mudflats, tidal wetlands, barrier islands and the various wildlife species of the Seaside was mounted on the platform. In 2009 (under a separate grant) an interpretive kiosk was added in front of the deck describing the ecological and economic value of the Seaside and the history of Willis Wharf as a working waterfront. Also in spring of 2009, through the *Plant ES Natives* campaign, a demonstration planting using all Eastern Shore native plants appropriate to the site was installed.

Virginia CZM Investment to Date: $30,000 to the Department of Game and Inland Fisheries

Aquaculture Codes of Practice and Best Management Practices

Working closely with the five largest members of the clam aquaculture industry (repesenting ~80% of total clam production), the Virginia Institute of Marine Science (VIMS) developed a draft set of Environmental Codes of Practice (ECOP) and Best Management Practices through the Virginia Seaside Heritage Program (VSHP). The draft ECOPs were presented at a 2003 annual meeting of clam growers on the Eastern Shore and received general endorsement.

The ECOP provides a set of guiding principals for environmental stewardship by the industry. The Environmental BMP's (i) identify specific environmental and social issues and potential conflicts, (ii) propose best management practices that minimize undesirable environmental consequences and promote social acceptance of clam aquaculture, and (iii) identify where information gaps exist for the further development of BMP's. The BMP's have recently been updated to include the findings and recommendations from a survey of derelict clam netting conducted as another element in the VSHP and from the shorebird prey study referenced above. The BMP's now incorporate elements related to site selection, site deliniation, predator protection, biofouling management, waste management, maintenance of water quality, disease management, exotic species, aesthetics and public education.

Virginia CZM Investment to Date: $39,400 to the Virginia Institute of Marine Science

Management and Education

Goal: *Develop management tools, improved enforcement capabilities and public education efforts. Develop a comprehensive Seaside inventory of natural resources and human use patterns that would form the basis for long term restoration and management strategies.*

Virginia Eastern Shorekeeper

The Virginia Eastern Shorekeeper (*www.shorekeeper.org*) provides year-round on the water monitoring of oyster reef sanctuaries, restored eelgrass beds and seasonal nesting bird areas on the barrier islands off the Eastern Shore of Virginia and assesses human impacts on these and other seasdide resources and Virginia Seaside Heritage Program (VSHP) restoration sites. The Shorekeeper's boat patrol hours provide valuable observations that assist law enforcement and barrier island resource managers. Aided by Creekwatchers, a Shorekeeper volunteer program, monitoring of cumulative human impacts has expanded significantly. The Shorekeeper helps distribution public education materials, such as the brochure "Life on the Beach isn't Always Easy" and has found these publications to a valuable tool to engage the public while on patrol.

Of particular note is the Shorekeeper's work with the clam and expanding oyster aquaculture industry to reduce the amount of discarded clam nets. This effort has had very positive results. A 2004 and later 2006 report, both titled - *"Discarded and Abandoned Aquaculture Clam Netting on the Atlantic Barrier Islands on the Eastern Shore of Virginia"* - document inventories conducted by the Shorekeeper of clam aquaculture netting. The Shorekeeper assessed the potential cumulative and secondary impacts of discarded clam netting to the Seaside's fragile ecosystem. Preliminary results indicate that the netting has little short term environmental impact and acts in a very similar fashion to beach wrack. However future study is warranted due to the longevity of the netting and its possible long term cumulative impacts. There continues to a positive momentum within the clam aquaculture industry to clean up these abandoned clam nets. Peer pressure from larger growers and a willingness by the growers to accept the discarded net as an image problem has reduced the amount of discarded netting. Clam growers worked with the Shorekeeper to create a "Clam Net Hotline" to report discarded net, which are then cleaned up by the growers. Over a three year period, 2004 – 2006, the amount of net on barrier island beaches dropped by 41 percent suggesting that the clam industry was being more responsible and major growers were beginning to actively police their co-op and independent growers. The Shorekeeper is also working with the clam industry to encourage voluntarily implementation of aquaculture Best Management Practices developed by VIMS through the VSHP.

The Shorekeeper also interacts with local kayak and nature operators, providing them with up-dated information and educational materials on Seaside resources and VSHP efforts. The Shorekeeper conducted a feasibility study of "on the water" camping platforms along the Virginia Seaside Water Trail through a 2007 Virginia CZM Program grant.

The Shorekeeper's patrol summary reports indicate that public awareness of Seaside resource stewardship has improved. Signage posted by VSHP partners near sensitive resources, such as beach nesting bird and oyster reef sanctuary sites, appears to have had an impact on the public's awareness and stewardship of these resources.

Virginia CZM Investment to Date: $122,200 to the Virginia Eastern Shorekeeper

Educating Landowners about Phragmites

In April and May 2005, the Department of Conservation and Recreation (DCR) offered four Phragmites workshops in Accomack and Northampton Counties which focused on the history, ecology, abundance, and control methods for Phragmites as well as strategies private landowners can apply to fight Phragmites invasions. Twenty-eight landowners attended these workshopsIn 2006, 5 additional landowner workshops were offered and attendance numbers climbed to 124 people. The second series of workshops emphasized responsible use of approved herbicides, recommended the use of contracted pest control specialists, and recommended combining financial resources with neighboring landowners to bring down costs.

A Web tool**,** the *Phragmites Mapping Application* was created to assess which Seaside land holdings currently support *Phragmites* invasions and to what extent. The user can zoom, pan, view, and print maps of *Phragmites* occurrences on the Seaside. *Phragmites* occurrences can be superimposed over the county tax parcel layers and polygons can be screen digitized to measure areas covered by *Phragmites*.

In April 2008, DCR published a new technical guidebook for landowners about the reasons and methods for controlling Phragmites titled "*Marsh Invader! How to Identify and Combat One of Virginia's Most Invasive Plants: Phragmites.*" This guidebook is downloadable from the VSHP website at *www.deq.virginia.gov/coastal/documents/task10-03-07.pdf* .

Four landowner workshops were held in summer of 2008. Two workshops were held in Accomack County at the Virginia Institute of Marine Science in Wachapreague and the two others were held in Northampton County.

Virginia CZM Investment to Date: *see "Habitat Restoration" Goal page Phragmites mapping, control and education –4*

Beach Nesting Bird Brochure

The Virginia CZM Program and its partners published a brochure in 2006 titled *"Life on the Beach Isn't Always Easy*" to help educate barrier island visitors about the critical role island habitats play in the life-cycle of beach nesting birds. Thousands of birds nest on the beaches of the barrier islands each year from April to September, which coincides with the height of tourism in the region. The survival of beach nesting birds on the islands is already difficult due to predation on eggs and small chicks, and natural forces such as storm waves and high tides which threaten to wash the nests away. People using these beaches can also affect the birds' survival by accidentally stepping on nests, bringing dogs to the island, and leaving trash on the islands which attract predators to these areas.

Funding Provided by Virginia CZM Program, US Fish and Wildlife and the Virginia Department of Game and Inland Fisheries

Public Seminar Series

A free monthly public seminar series is being held at the University of Virginia's Anhueser Busch Coastal Research Center (ABCRC) in Oyster, Virginia centered on research and management activities supported through the Virginia CZM Program and the Virginia Seaside Heritage Program. Topics have covered an overview of the VSHP; the history and geomorphology of the VA Barrier Islands; eelgrass ecology and restoration effort; the ecology of Oyster Catchers; the ecology of sea turtles found in Virginia waters; habitat restoration for migratory songbirds; an overview of the Natural Heritage Program on the Eastern Shore; and responses/impacts of local salt marshes to sea level rise. Growing popularity of the seminar series has not only filled the meeting room to capacity, it has resulted in several "in-kind" donations of free advertising, and printing expenses.

Virginia CZM Investment to Date: $5,000 to the University of Virginia

Educational Signage

The Virginia CZM Program worked with A-NPDC and VSHP partners to design and install educational signage along the Seaside Water Trail highlighting the ecological and economic value of Seaside resources. In spring 2009, signs went up in Oyster, Chincoteague, Wachapreague, Willis Wharf and at the Wise Point Public Ramp in the ES of Virginia Wildlife Refuge.

Virginia CZM Investment to Date: $14,725 to the Accomack Northampton Planning District Commission

Village of Oyster Vision/Plan

In 2004 the Village of Oyster received a Virginia CZM Program grant to create a village plan for the future of Oyster that serves as the foundation for future community and local government decisions. Development of the plan involved a citizen-based visioning effort, with professional facilitation and support from The Nature Conservancy. The community of Oyster sees itself in the future as "preserving the Village's traditional character with its historic maritime culture and lifestyle; maintaining and enhancing the quality of the natural resources around the Village; and supporting the needs of the commercial and recreational users of its waterfront without compromising the residential character and rural village way of life."

Virginia CZM Investment to Date: $4,500 to Citizens for a Better Eastern Shore and The Nature Conservancy

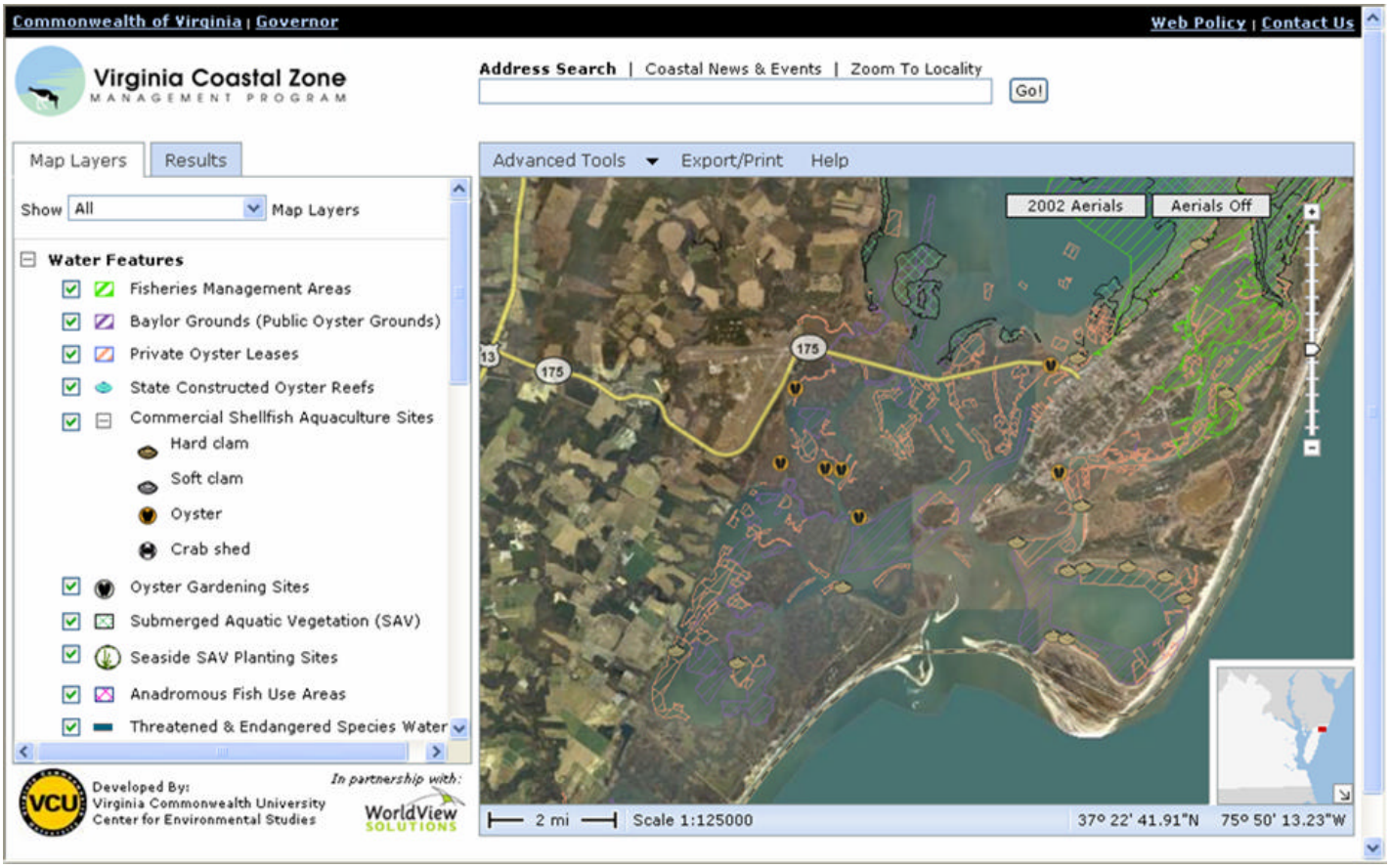
Native Plant Social Marketing Campaign

In April of 2009, the Virginia CZM Program launched a new social marketing campaign – "Plant ES Natives" - to increase the use of native plants on the Eastern Shore to help protect water quality and increase habitat for wildlife. Working with a planning team including many local partners, the program conducted research to determine the barriers to native plant use and designed a community-based social marketing campaign designed to remove these barriers. A report detailing the research findings, describing the campaign's design, and tracking the implementation of the campaign is available at http://www.deq.virginia.gov/coastal/go-native.html. A new guide "Native Plants of Accomack and Northampton", produced through the campaign, is also downloadable from the campaign website.

Virginia CZM Investment to Date: $41,687

Seaside Mapped Resources on the Coastal GEMS Internet Mapping Website

Coastal GEMS, developed and maintained by the Virginia CZM Program, serves as the foundation for long term restoration and management strategies for the Seaside of Virginia's Eastern Shore. Coastal GEMS includes data layers for the Virginia Seaside Heritage Program boundary, Seaside Water Trail, Seaside public access locations, Birding and Wildlife Trail, barrier island ownership and access, important bird areas, migratory songbird stopover habitat, oyster restoration sites, seagrass coverage and restoration sites, hard clam and oyster aquaculture permit sites, clam and oyster aquaculture suitability models, and *Phragmites* coverage. (*http://www.deq.virginia.gov/coastal/coastalgems.html)*



The screenshot above from Coastal GEMS shows important water features near Chincoteague, including clam and oyster permitted aquaculture sites, seagrass, public oyster bottom, private oyster leases, and fisheries management areas.

Seaside Special Area Management Plan (SAMP)

The Virginia CZM Program worked with the University of Virginia and its Virginia Seaside Heritage Program partners to draft a Seaside Management Plan in the spring of 2008. In spring of 2009 the partners agreed to narrow the scope of the Seaside SAMP to focus on resources in the water and develop a "marine spatial plan" that will promote compatible uses of the seaside that ensure long term sustainability of the ecosystem, are fair to all stakeholders, and promote efficient use of resources.

Virginia CZM Investment to Date: $44,100 to the University of Virginia and $280,000 to be allocated.